What is claimed is:

1. An irrigated ablation catheter assembly, comprising:

a catheter shaft including a proximal end, a distal end, a fluid port in proximity to the proximal end, and a fluid delivery lumen extending from the port toward the distal end;

a helical ablation electrode comprising a tube coupled to the catheter shaft and extending distally from the distal end of the catheter shaft; the electrode including a first end, a first portion extending from the first end and winding about a first diameter, a second portion extending from the first portion and winding about a second diameter smaller than the first diameter, a second end terminating the second portion, and a fluid lumen extending through the tube from a location in proximity to the first end to a location in proximity to the second end and in fluid communication with the fluid delivery lumen of the catheter shaft;

wherein an irrigation fluid delivered through the fluid port of the catheter shaft passes through the fluid lumen of the ablation electrode to cool the electrode.

2. The irrigated ablation catheter assembly of claim 1, wherein the tube includes an outer diameter and the electrode includes a pitch, the pitch approximately equal to the outer diameter of the tube.

3. The irrigated ablation catheter assembly of claim 1, wherein the tube includes an outer diameter and the electrode includes a pitch, the pitch greater than the outer diameter of the tube.

4. The irrigated ablation catheter assembly of claim 1, wherein the first end of the helical ablation electrode extends into the catheter shaft and provides the fluid communication between the fluid lumen of the electrode and the fluid delivery lumen of the catheter shaft.

5. The catheter assembly of claim 4, wherein the fluid lumen of the helical ablation electrode opens exterior to the catheter shaft in proximity to the second end of the electrode.

6. The catheter assembly of claim 4, wherein the helical ablation electrode further includes a plurality of fluid exit ports positioned between the first end and the second end and the fluid lumen of the ablation electrode opens exterior to the catheter shaft at the plurality of fluid exit ports.

7. The catheter assembly of claim 6, wherein the second end of the helical ablation electrode extends into the catheter shaft and provides additional fluid communication between the fluid lumen of the electrode and the fluid delivery lumen of the catheter shaft.

8. The catheter assembly of claim 1, wherein the second end of the helical ablation electrode extends into the catheter shaft and provides the fluid communication between the fluid lumen of the electrode and the fluid delivery lumen of the catheter shaft.

9. The catheter assembly of claim 8, wherein the fluid lumen of the helical ablation electrode opens exterior to the catheter shaft in proximity to the first end of the ablation electrode.

10. The catheter assembly of claim 8, wherein the helical ablation electrode further includes a plurality of fluid exit ports positioned between the first end and the second end and the fluid lumen of the electrode opens exterior to the catheter shaft at the plurality of fluid exit ports.

11. The catheter assembly of claim 1, wherein:

the catheter shaft further includes a second fluid port in proximity to the proximal end and a second fluid delivery lumen extending from the second port toward the distal end of the shaft;

the first end of the helical ablation electrode extends in the catheter shaft and provides the fluid communication between the fluid lumen of the electrode and the fluid delivery lumen of the catheter shaft; and

the second end of the ablation electrode extends into the catheter shaft and provides additional fluid communication between the fluid lumen of the ablation electrode and the second fluid delivery lumen of the catheter shaft.

12. The catheter assembly of claim 11, wherein the fluid port is adapted to send fluid through the fluid delivery lumen of the catheter shaft to the fluid lumen of the ablation electrode and the second fluid port is adapted to receive fluid through the second fluid delivery lumen of the catheter shaft from the fluid lumen of the ablation electrode.

13. The catheter assembly of claim 11, wherein the second fluid port is adapted to send fluid through the second fluid delivery lumen of the catheter shaft to the fluid lumen of the ablation electrode and the fluid port is adapted to receive fluid through the fluid delivery lumen of the catheter shaft from the fluid lumen of the ablation electrode.

14. The catheter assembly of claim 1, further comprising a tip, extending distally from the distal of the catheter shaft, which the helical ablation electrode winds about.

15. The catheter assembly of claim 14, wherein the tip further includes a sidewall and the first end of the ablation electrode extends through the sidewall to provide the fluid communication between the fluid lumen of the ablation electrode and the fluid delivery lumen of the catheter shaft.

16. The catheter assembly of claim 15, wherein the fluid lumen of the helical ablation electrode opens exterior to the tip in proximity to the second end of the electrode.

17. The catheter assembly of claim 15, wherein the helical ablation electrode further includes a plurality of fluid exit ports positioned between the first end and the second end and the fluid lumen of the ablation electrode opens exterior to the tip at the plurality of fluid exit ports.

18. The catheter assembly of claim 17, wherein the second end of the ablation electrode extends through the sidewall to provide additional fluid communication between the fluid lumen of the ablation electrode and the fluid delivery lumen of the catheter shaft.

19. The catheter assembly of claim 14, wherein the tip further includes a sidewall and the second end of the ablation electrode extends through the sidewall to provide the fluid communication between the fluid lumen of the ablation electrode and the fluid delivery lumen of the catheter shaft.

20. The catheter assembly of claim 19, wherein the fluid lumen of the helical ablation electrode opens exterior to the tip in proximity to the first end of the electrode.

21. The catheter assembly of claim 19, wherein the helical ablation electrode further includes a plurality of fluid exit ports positioned between the first end and the second end and the fluid lumen of the ablation electrode opens exterior to the tip at the plurality of fluid exit ports.

22. The catheter assembly of claim 14, wherein:

the catheter shaft further includes a second fluid port in proximity to the proximal end and a second fluid delivery lumen extending from the second port toward the distal end of the shaft;

the tip further includes a sidewall;

the first end of the ablation electrode extends through the sidewall of the tip to provide the fluid communication between the fluid lumen of the ablation electrode and the fluid delivery lumen of the catheter shaft; and

the second end of the ablation electrode extends through the sidewall of the tip to provide additional fluid communication between the fluid lumen of the ablation electrode and the second fluid delivery lumen of the catheter shaft.

23. The catheter assembly of claim 22, wherein the fluid port is adapted to send fluid through the fluid delivery lumen of the catheter shaft to the fluid lumen of the ablation electrode and the second fluid port is adapted to receive fluid through the second fluid delivery lumen of the catheter shaft from the fluid lumen of the ablation electrode.

24. The catheter assembly of claim 22, wherein the second fluid port is adapted to send fluid through the second fluid delivery lumen of the catheter shaft to the fluid lumen of the ablation electrode and the fluid port is adapted to receive fluid through the fluid delivery lumen of the catheter shaft from the fluid lumen of the ablation electrode.

25. The catheter assembly of claim 14, wherein the tip is an extension of the catheter shaft.

26. The catheter assembly of claim 14, wherein the tip is a component coupled to the distal end of the catheter shaft.

27. The catheter assembly of claim 14, wherein the tip comprises a flexible, temperature resistant and biocompatible polymer.

28. The catheter assembly of claim 14, wherein the tip comprises a solid core.

29. The catheter assembly of claim 14, wherein the tip comprises a hollow core.

30. The catheter assembly of claim 14, further comprising a filler material filling one or more gaps between windings of the helical ablation electrode.

31. The catheter assembly of claim 30, wherein the filler material comprises an electrically conductive material.

32. The catheter assembly of claim 30, wherein the filler material comprises an electrically insulative material.

33. A helical ablation electrode, comprising:

a first end, a first portion extending from the first end and winding about a first diameter, a second portion extending from the first portion and winding about a second diameter smaller than the first diameter, a second end terminating the second portion, and a fluid lumen extending from a location in proximity to the first end to a location in proximity to the second end in fluid communication with an exterior surface of the electrode;

wherein an irrigation fluid passes through the fluid lumen of the ablation electrode to cool the electrode.

34. The helical ablation electrode of claim 33, further comprising a plurality of fluid exit ports positioned between the first end and the second end.

35. The helical ablation electrode of claim 33, further comprising a non-conductive tip around which the electrode winds.

36. The catheter assembly of claim 35, wherein the tip comprises a flexible, temperature resistant and biocompatible polymer.

37. The catheter assembly of claim 35, wherein the tip comprises a solid core.

38. The catheter assembly of claim 35, wherein the tip comprises a hollow core.

39. The catheter assembly of claim 35, further comprising a filler material filling one or more gaps between windings of the helical ablation electrode.

40. The catheter assembly of claim 39, wherein the filler material comprises an electrically conductive material.

41. The catheter assembly of claim 39, wherein the filler material comprises an electrically insulative material.

42. A method delivering ablation energy to a target site, comprising:

causing cooling fluid to flow through a lumen of a helical ablation electrode, which terminates a distal end of a catheter;

energizing the electrode to deliver ablation energy; and

pushing or dragging the distal end of the catheter along a target ablation site.

43. The method of claim 42, wherein the helical ablation electrode comprises a first end, a first portion extending from the first end and winding about a first diameter and a second portion extending from the first

portion and winding about a second diameter smaller than the first diameter.